Chairman Kennard asked about success stories. We've had many factors that lead to successful users of our technology. Key has been the hybrid nature of the services that can be offered. We have customers in economically disadvantaged areas that use our equipment for pre-paid cards and basic pay phone capabilities. We have many voice applications. I will point out that the revenue per bit on voice is still 15 times that of data, so operators continue to enjoy good revenues from voice.

We also have frame-relay networks, private virtual data networks, managed data networks, all taking advantage of the capabilities of our technology. It's this combination of services that allow operators around the world to be able to have business plans that actually work, and I believe those business plans are equally valid in the rural area and the suburban and urban area when wireless technology is used as the enabling platform.

We eliminate the needs for high concentration of customers in a limited area because of the range of our product, which extends up to 10-15 miles from a single base station. This range fits very well with the topology that you find in the Midwestern United States, where urban centers tend to be separated by seven or eight miles.

This enables base stations to be deployed in each urban center, hanging off of fiber rings that have been

developed and access provided to customers both in town and also on the periphery of town.

So again, on behalf of Airspan Networks, I'd like to thank all of you here for your interest and look forward to seeing a lot more initiatives in the rural area in the US. Thank you.

(Applause.)

MR. THOMS: Eric, thank you.

Michael Thompson.

MR. THOMPSON: Good afternoon. I appreciate the opportunity to address our distinguished panel and guests.

I remember a time not so long ago when many felt there would be no wireless services in rural America. Indeed the FCC did not even license cellular into the first rural markets until nearly seven years after the first metro services had already been launched. Today it is widely recognized that wireless holds the key to not only the deployment of basic services to all Americans but also to the future availability of advanced services in rural America.

Unfortunately for rural American, advanced telecommunication services are available to only a small segment of that population. While advances in wire-line technology will close the digital divide with respect to some consumers, wireless technology is best suited for and

in many cases is the only means of serving telecommunications needs of rural consumers.

Western Wireless is committed to deploying advanced telecommunication services in rural America. Our company is a rural telecommunication service provider with state-of-the-art facilities in place throughout its 19-state, 800,000 square mile coverage area. We actually cover 25 percent of the continental US but only 3 percent of the population. On average, the areas that we serve have 10 people per square mile, and yet today we provide basic cellular service to nearly 900,000 customers.

But basic cellular mobility service is only a part of our story. Over five years ago Western Wireless launched wireless local-loop service in the Reese [phonetic] and Antelope Valleys of Nevada, where it is a sole provider of basic telephone service. More recently, we launched service in Regent, North Dakota, where we are a competitive provider of basic telephone service.

Earlier this month we were designated as an eligible telecommunications carrier for ETC in Minnesota, and have already started to offer service to communities in that state. Additionally, Western Wireless has been working closely with several Native American reservations to make affordable telephone service available to all tribal residents.

Western Wireless's trials and tribulations with respect to entering the universal service market are well documented, and I will not discuss them here today, but I will discuss how the designation of Western Wireless as an ETC in Minnesota has led to the provisioning of competitive telecommunication services in some of the most rural areas of that state and will lead to the availability of advanced telecommunication services.

The principal gaining factor in making advanced services available to all consumers in rural areas is the availability of network facilities capable of supporting high-speed data services. Until recently the focus of policymakers was to provide financial support to only the incumbent local exchange carrier with the hope that this carrier would provide all the services, both basic and advanced, that consumers want.

It's clear, though, that new and innovative services, including many advanced services will not naturally evolve in a non-competitive market such as a local exchange market we see in most rural areas. However, when competitive carriers have entered these markets, new and advanced services have generally been made available to consumers.

We believe the message is clear. Policymakers must take steps to encourage competitive carriers to enter

rural markets. This new competition will lead to reduced prices, better service, and the availability of new and innovative services including advanced services.

Now I would like to talk about what Western Wireless is specifically doing to bring advanced services to rural America. Western Wireless has backed up its advocacy for establishment of competitive local telephone markets in rural areas with a deployment of new, innovative, and competitive services. In Minnesota, Western Wireless has launched wireless local loop service in 21 rural communities in the first two weeks following their official ETC designation.

We will launch service in 12 more communities in April and many more in the months that follow. In each of these markets we have launched a competitively priced service with a local calling area several times larger than that currently offered by the incumbent LEC.

For the first time ever, these residents will enjoy the benefits of competition when making their choice of basic telecommunication services.

Designation as an ETC and the resulting availability of universal service support will lead directly to the construction of additional cell sites and transmission facilities. This in turn will enable Western Wireless to serve not only the basic telephone needs of all

consumers but will also allow Western Wireless to serve the advanced telecommunications needs of consumers.

Where today rural customers are lucky if they can gain access to the Internet as speeds of 28.8 kilobits per second, Western Wireless's planned universal service offering will support data rates of up to 156 kilobits per second in many markets by the end of next year, and as third-generation wireless technology becomes commercially available, data rates of more than 1,000 kilobits per second will be supported.

As you can see, the deployment of next generation cellular network infrastructure throughout rural areas made possible by universal service support will result in the availability of advanced telecommunications services to all consumers in fulfillment of the promises of the Telecommunications Act of 1996.

Thank you very much.

(Applause.)

MR. THOMS: Michael, Thank you.

John?

MR. STUPKA: Thank you. It's a pleasure to be here today, and with only a few minutes for formal remarks I intend to focus tightly on but one tool that Worldcom is using to ensure it can provide high-speed services to as many people as possible as soon as possible. That tool is

fixed wireless services in the 2.5 gigahertz range.

Let me tighten up my terms a bit so we all visualize the same thing. High speed means data rates of about 2 megabits per second. The radio channels we'll be using are capable of 10 megabits per second, but most people won't need that much horsepower. In fact, I think we're going to find that most people will not want more than a few hundred kilobits per second, but it will be there for those who need it.2

Serving as many people as possible means deploying the technology that has a cost structure that allows for cost-effective operation in areas of low density of population or low initial demand. To do this, you need a technology that has modest first costs to be ready to serve and modest investments at the customer location when the subscriber is acquired. The MMDS spectrum of 2.5 gigahertz has those characteristics. I'll talk more about that later.

"As quickly as possible" means creating enough scale to get the vendor community and the development community committed to product development solidly enough to cause pricing to come down fast enough where people can buy the service. We think that the consolidation that's gone on in the MMDS industry, coupled with the Worldcom-Sprint merger, would create that missing piece.

We think that everybody should live and work

where they like and still have access to a myriad of services. That means we must find the delivery tools that allow for profitable operation in environments of sparse subscription.

Some technologies do require higher densities to provide reasonable economics. For example, a cable system will require reasonably high subscription rates to cash flow at a point that fuels demand. If you have too many miles per user, it just won't work. With 2.5 gigahertz fixed wireless we can create a delivery system that can help people in and out of town get access to high-speed data sooner and better.

Let me explain starting with Sioux City, and then I'll work my way out to the rural.

In Sioux City today you probably have two companies capable of offering high-speed access, the incumbent telco and the cable TV operator. One or both may be available to many customers, but not to all customers. Both the Telco and the CATV company have significant penetration of homes passed. This means they have a core business that offsets a lot of their fixed costs.

How possibly can another provider make things more competitive and still make money? The answer is that they require a delivery system that can have a comparable cost structure at low penetration and teledensity. We think

MMDS fixed wireless at 2.5 gigahertz is the ticket. A simple example clarifies this statement.

A fully-equipped MMDS site will cost somewhere between $400,000 and $600,000. This site is capable of serving thousands of high-speed customers and can scale up quite nicely. Remember the high end of my estimate, $600,000. The frequencies of MMDS at 2.5 gigahertz propagate very, very well.

In Jackson today, we have some customers 30 miles out from the tower, but let's just say a ten-mile radius to be conservative. The area served by a cell of ten miles is slightly over 300 square miles, so we can be ready to serve for 600,000 divided by 300, or $2,000 per square mile. How much cable for fiber can you lay for $2,000 within a square mile? You can be an effective third player with MMDS.

Now let's go to the rural, where it's likely that you can place a very tall tower at a reasonable cost. Now assume a 25-mile radius and you're covering 2,000 square miles, so now we're down to $300 per square mile to be ready to serve. That means you have great reach and lots of land to find customers and many of them are hungry for advanced services. We think that this basic technology can be the platform that efficiently bridges the digital divide.

The key to broad acceptance will be physical deployment and reasonable price point. First, thanks to the

FCC, the physical deployment should begin to take place late in 2000. Applications for two-way operation can start being accepted in July of this year. We are anxious to bring the new products to market. We have spectrum today that will allow us to come to market in a limited fashion. We use the WCS spectrum. So we know, to answer your question, that the people do want the services and will take the services.

Getting to a reasonable price point means that vendors must be convinced that a large market will be available. That translates to a cohesive product plan during the early deployment years. We are committed to get the scale to get to market soon.

For most of us today being out of high-speed options doesn't mean being very rural. For example, I live north of Jackson, Mississippi, and until last Saturday I had no options for high-speed data. Neither the telco via DSL nor my cable company via modem offered the service in my housing addition. I now have it with MMDS and it's great. I simply slip a card into my laptop and I'm connected anywhere in the house. I'm connected at the home as I am at the headquarters of Worldcom.

Again, I would like to thank you for this opportunity to be at this forum and I look forward to all the progress we're going to create together. Thank you.

(Applause.)

MR. THOMS: John, thank you very much.

Mr. Chairman, that completes our panels. If you have any questions we'd be happy to respond.

CHAIRMAN KENNARD: Thank you. That was really a fascinating discussion.

I would be remiss if I didn't acknowledge one of the people here who's not on the panel, and that's Allan Thoms, for all of the help that Allan has given to me personally during my tenure as chairman. I feel very fortunate that my tenure as chairman of the FCC coincided with Allan's tenure as one of the leaders of the Communications Committee of the National Association of Regulatory Utility Commissioners, because it's been a really very productive partnership, and I think all of you should know how hard Allan works for you, not only in Iowa but also nationally and at the FCC.

Allan, thank you.

MR. THOMS: Thank you.

(Applause.)

CHAIRMAN KENNARD: At the earlier panel I talked a little bit about moving our universal service subsidy structure away from a wireline-centric viewpoint, and I think that these panelists explain why that is so important, but I think they also touched briefly on how difficult it is to do.

We have developed in this country a very complex universal service subsidy system that has really been developed for the wireline world, and we're just now with the Telecommunications Act of '96 beginning to move into a new way of looking at universal service.

People often talk to me about universal service and competition and they say you can't have competition and universal service. One has to give way to the other. And that's just not true. These concepts are in tension with one another oftentimes, but they can be reconciled, and I think one way that we're going to see that done is through the use of wireless technologies.

And I'd like to explore that a little bit with Michael Thompson, because your company has really pioneered bringing wireless service to rural parts of the country, and I think that historically what you accomplished in Minnesota will be seen as a watershed in the future. The ability to get recognized as an eligible telecommunications carrier and participate in the subsidy system, I think is going to be very -- historically very important.

And I'm wondering if you could tell us a little bit more about the challenges that you faced in Minnesota and other states as you have gone in to convince policymakers that wireless is a viable alternative and you can have a competitive telephone system and universal

service can thrive in those rural states.

MR. THOMPSON: I think, first of all, that we've been fighting a guerrilla war throughout the states in which we provide service and have actually applied for ETC status in I believe 13 states and intend to apply in the other six states within the next two or three months.

Each state has been a different kind of battleground. We've faced in large part public utilities commissioners who had never thought about the concept of giving universal service funding to anybody but telephone companies and particularly rural telephone companies.

We were very fortunate that the folks in Minnesota saw things our way, decided to buck the trends and go out and give us a chance to provide some competitive services to the people in rural Minnesota -- and by rural Minnesota, the largest town that we are currently providing universal services to is about 2,000 people in Minnesota of those 21 communities that I talked about.

We're not having as much luck in other markets but we believe that in a lot of cases states are sitting back and looking to see how we and how others that are looking for this status do once it's provided. And so I think Minnesota is not only going to be a watershed event, it's also going to be one that's going to be looked at with a great deal of scrutiny.

And we have had some problems. In Kansas we've gotten limited status. In North Dakota we've gotten limited status. In Kansas there is a state fund in place and we plan to take advantage of that, but in North Dakota with that limited status we can go in and compete against US West and GTE or whatever they're calling themselves today. But there is no funding mechanism in place to provide universal service funds from the state fund in North Dakota, so it's -- we can go in and do it but we won't get any benefit for it.

The problem is that to provide these services out there, it's not an even playing field today. The rural license holders are providing service at $10 to $15 per household per line and they are getting subsidies of as much as $200 to $300 per line per month, and wireless carriers are getting no access to those monies whatsoever. Clearly, we're not looking for 2- or $300 per line per month. We can provide that service significantly less expensively than the rural telcos can, but we believe the playing field needs to be evened a little bit more.

We are getting some support for our position in some states, and we look forward to spreading that message throughout rural America.

CHAIRMAN KENNARD: Thank you very much.

Chris?

MR. McLEAN: The two-tiered system of universal service support as you mentioned with US West in most states being ineligible for high-cost support and the support being available in rural LECs -- does that affect your decision into which markets to enter?

In other words, are you being drawn perhaps artificially to markets of rural LECs and avoiding markets that are served by carriers that do not receive universal service support?

MR. THOMPSON: That's clearly the case. We are drawn to markets where there is actual funding available at some point in time, and the US West markets in North Dakota are not currently in that category.

MR. McLEAN: And are the services that you're offering comparable in terms of both voice and data capabilities to the incumbent carrier?

MR. THOMPSON: Today the voice is if anything better than what's being provided by the rural Telecos in that we have significantly larger local service areas and so there is a competitive benefit for many of the rural customers to go in our direction. The Regent, North Dakota example where we've been up now for about a year -- we have about 50 percent of the households in Regent, North Dakota that have our service.

We -- on a data scale we are still back in the

stone age today. We plan to develop and put data speeds out as soon as the technology is developed and we expect to see that in 2001 for the TDMA technology it will provide.

MR. McLEAN: What would be your present data speed?

MR. THOMPSON: We can do about 14.4.

MR. McLEAN: One last question on mobile wireless. Do you have an estimate of unserved territories in rural America -- gaps? We've all been on highway using the cell phone or PCS and then you're dropped off and lost. Does anyone have a good estimate of areas that are unserved by mobile wireless capability?

MR. THOMPSON: We believe that we are probably licensed in the most rural parts of at least the continental US. We have the states of Montana, North Dakota, South Dakota, much of Nebraska, some of Iowa, some of Kansas, West Texas, the parts of Nevada where nobody lives, and we have coverage for 99 percent of the people that live and work in those markets.

We also cover approximately 91 percent of the square miles we're licensed to cover, so in the most rural parts of the United States there is cellular or wireless coverage available to virtually everyone.

MR. McLEAN: Do any of the other panelists have an estimate on mobile?

CHAIRMAN KENNARD: One of the things that obviously we're here to talk about is advanced services, and I'm convinced that as technology changes and as Americans get more and more hooked on-line, we're going to have to re-define what universal service means. And that's a big part of this whole 706 effort, is to make sure that policymakers are keeping up with what's happening in the marketplace.

John Chambers [phonetic], who is the Chairman of the Cisco Systems, says frequently that the Internet moves in dog years. What happens over the span of about seven years in every other industrial organization happens at Internet speed in about a year, and so we've got to make sure that we're keeping up.

What I'd like to know as we talk about wireless is how are we going to make sure that if we place our bets in wireless to serve our universal service needs, how are we going to assure the public that the wireless platform will provide the public with the very high data rates that they'll need to access all the things that people are going to want to download over the Internet in broadband, CDs and movies and magazines and what-not, all the things that are driving this AOL-Time Warner merger. I know you folks must worry about -- John, you touched on this a little bit.

Can you tell us what is the future picture of wireless data rates and how are you going to ensure the

public that you'll be able to keep pace with the demand for bandwidth?

MR. STUPKA: Probably one of the casualties of the technological change we've had over the last two years is our glossary of terms, our vocabulary. How many of you know what high-speed data is anymore? I don't think there's a definition for high-speed data any more.

What we're doing at Worldcom to try to make sure we're prepared for the future is we try to select technologies that have the largest bandwidth possible, understanding that the person might not need something that broad, that fast today, and so you can use it as a shared resource today, yet you can evolve into something where the people can have the access in the future. So I think one thing you can do to future proof is try to make sure that you're building systems that have inherent in their design the capacity to go to higher speed should people want it.

I'll give you an example. We're using the unlicensed, the 80211 technology to do that last link, that last 3-, 400 yards in some of our trials. The inherent capability of that today is 11 megabits per second. My MMDS which has a basic channel structure of 6 megabits per second actually chokes down the last link. When was the last time in telecommunications technology that the last link found itself being choked by the network? It's normally just the

reverse.

So at Worldcom what we're trying to do is make sure that we're investing in the technologies that are inherently broadband, that inherently can offer the higher speeds, and we can have the efficiency in the near term by using the shared resources and the flexibility to let them evolve as the user needs move forward.

CHAIRMAN KENNARD: Thank you very much.

Do we have any other questions from the panelists?

MR. THOMS: Mr. Chairman, thank you very much, and please help me thank the panel here today. They did a --

(Applause.)

MR. THOMS: Now with the chairman's concurrence I'm going to ask you all for a favor here before I excuse my panel, because the next panel is on telemedicine. It's an excellent panel and we've had people come from quite some long distances, one whom spent most of the morning in Minneapolis in thunderstorms, and I'd like to get right to that panel if that would be all right and skip that break, Mr. Chairman?

CHAIRMAN KENNARD: That would be fine.

MR. THOMS: And so if any -- there is a break scheduled but we're about 25 minutes past the time to start

up, so if we can do that right now we'll get into the panel; you can go out if you want to but I wouldn't suggest it because I think it's going to be a great panel. Thank you.

(Whereupon, a short recess was taken.)

MS. SANFORD: Thank you. We will begin now. If we'll come to order, let's begin with our last panel of the day.

Let me briefly address the public input part of this proceeding, which will occur after this panel. There are two ways that you may participate in this proceeding. One is to see Bill Smith of the Iowa Commission to sign up to speak, and the other is to file written comments, and Bill Smith can also help you with that.

Let me move quickly to introducing Anne Boyle. Anne is of Omaha, Nebraska, and was elected to the Public Service Commission in Nebraska in 1996. Her background is in real estate, public relations, and the arts. She brings a strong commitment to public service and civic activity, and I present her to you this afternoon as the moderator of our third panel, which is on telemedicine.

(Applause.)

MS. BOYLE: Thank you, Commissioner Sanford.

This afternoon first I would like to also acknowledge the Nebraska commission members -- employees who helped with this very successful event -- and I'm

acknowledging them knowing that they're not in the room -- Jean Hand [phonetic] and John Verbatis [phonetic] and Larry Faus [phonetic]. When you see them later, they did a wonderful job working with the Iowa commission. Also, I'd like to acknowledge Chris Post [phonetic] and Shannon Vincent [phonetic] and Mike Leffler [phonetic], who are staff attorneys who keep me out of trouble most of the time.

And finally, Chris McLean, you are a native Omahan, and it is wonderful to have you in the post that you are about to take, and you do us all well and make us very proud. You are one of our favorite sons, along with -- Senator Kerrey, I am so sorry you are leaving the U.S. Senate. I think this afternoon all of you have seen what he is like, and he will be very difficult to replace; as a matter of fact, I think is irreplaceable.

This afternoon we are going to talk about telemedicine. We've heard telecommunications -- the technology we have today can do a great deal in helping maintain the vitality of our rural communities. And certainly another part of that is to help the citizens of those communities at a time that usually is a very stressful time of their lives to provide health care services.

In a state like Nebraska where some people have to maybe travel hundreds of miles, think what it means to their families when they may only have to travel a-12345X

distance and be able, through the miracle of telecommunications, to have counseling services or diagnostic services so that they may relieve their minds and get the medical help that they need.

We have a very talented panel this afternoon, and I would like to introduce all of them who will talk to you about some of the challenges in this field, and one of components of it is also the insurance industry.

We've taken the liberty of inviting some members of the insurance industry. I see Randy Bolt [phonetic], who is with Blue Cross-Blue Shield. I also invited some of the Mutual of Omaha and other insurance industry representatives, because that also is a part and parcel of solving the problem of paying for the services that we need.

First on the panel is Dr. Reba Benschoter. Dr. Benschoter is a professor and director of biomedical communications at the University of Nebraska Medical Center in Omaha. From 1984 to 1994, she also served as the Dean of the University Medical Center School of Allied Health Professions.

Since 1957 she has been involved in the development and application of educational technology at the University of Nebraska and nationally has assumed leadership roles in such organizations as the Health Services Communications Association and the Association of Biomedical

Communication Directors.

In 1964 she served as project director for a federal grant, establishing the nation's first long-distance two-way medical television system linking UNMC with the state mental hospital in Norfolk, Nebraska.

Today under her direction the biomedical communications unit provides full and structural media services including extensive two-way television network applications across Nebraska to support the medical center's health professions education in the major rural communities of the state.

Next is Donna Hammack. Donna is the director of grants and special projects at Good Samaritan Hospital in Kearney, Nebraska. She has served in that capacity since 1989. She has been a presenter at a variety of conferences, including the Center for Telemedicine Law Conference in Washington, D.C., the Governor's Statewide Conference on Telecommunications in Kearney, Nebraska, Sitcom [phonetic] challenges to the delivery of health care in rural America in Madrid, Spain, and she also presented at the Catholic Managed Care Consortium in Chicago, Illinois.

In addition to that, Donna continues to keep in touch with all of -- serving on a variety of boards and most important though is the one that she serves as co-chair of for the Community Council of the Nebraska Information

Technology Commission.

Lastly is Dr. Michael Kienzle, and Dr. Kienzle is the one who's traveled so long today, getting up at 3:30 this morning, trying to get here via Minneapolis. The bad weather that was supposed to be in Eastern Nebraska and Western Iowa just went up in Minnesota. Sorry, Doctor, but we truly appreciate your efforts to get here.

Dr. Kienzle received his medical degree at the University of Iowa. He spent seven years in Philadelphia training in internal medicine, cardiology, and cardielectrophysiology. He now is a professor of medicine and serves as the associate dean for clinical affairs and biomedical communications at the College of Medicine at the University of Iowa.

He serves as the coordinator of the Iowa Health Services Education Telecommunications Network and is responsible for coordinating the health services-health science uses of the Iowa Communications Network.

Dr. Kienzle is also the project director of the National Library of Medicine supporting the establishment of the University of Iowa National Laboratory for the Study of Rural Telemedicine. He has served on the Telecommunications Health Care Advisory Committee at the Federal Communications Commission and currently chairs a telemedicine advisory committee of the Iowa Telecommunications and Technology

Commission, the body responsible for the oversight of the Iowa Communications Network.

He serves also on the Information Technology and ad hoc telemedicine committees of the American College of Cardiology.

Please welcome with me our panelists.

(Applause.)

MS. BOYLE: Dr. Benschoter, would you like to begin?

DR. BENSCHOTER: I was really counting on being the tail end, just because -- I'm here really for the historical perspective of telemedicine, perhaps. Back in 1959, Dr. Susan Woodson at the University of Nebraska Medical Center began experimenting with two-way interactive television to provide psychiatric care.

Finally in 1964 the National Institute of Mental Health provided a grant which allowed the construction of a microwave system which made it possible then for Omaha-based psychiatrists to use two-way video to treat and follow up patients that were in Norfolk State Mental Hospital, which is about 90 miles from Omaha as the crow flies.

In addition, a staff development program was provided for the mental hospital care givers, and University of Nebraska med center students used the two-way broadband video system to learn about mental hospitals and mental